

**FUTURE FISHERIES IMPROVEMENT PROGRAM
GRANT APPLICATION***(please fill in the highlighted areas)***I. APPLICANT INFORMATION**

- A. Applicant Name: Carl Johnson
- B. Mailing Address: 911 Tumbleweed Lane
- C. City: Deer Lodge State: MT Zip: 59722
Telephone: 406-846-1378
- D. Contact Person: Will McDowell, Clark Fork Coalition
Address if different from Applicant: Box 7593
City: Missoula State: MT Zip: 59807
Telephone: 406-396-7716
- Landowner and/or Lessee Name
E. (if other than Applicant): Rick and Pam Hirsch
Mailing Address: 3257 Yellowstone Trail
City: Deer Lodge State: MT Zip: 59722
Telephone: 406-846-3018

II. PROJECT INFORMATION*

- A. Project Name: Johnson Diversion Replacement
River, stream, or lake: Racetrack Creek, Clark Fork River drainage
Location: Township T10N Range R7W Section 12
County: Powell County
- B. Purpose of Project:

The purpose of this project is to replace a rustic irrigation diversion which blocks upstream fish passage and entrains fish with a rock weir diversion which enhances fish passage. This project will benefit fluvial brown trout, mountain whitefish, westslope cutthroat and other native fish in an FWP high-priority restoration watershed due to its important spawning and rearing habitat for sport and native fish.
- C. Brief Project Description:

The Johnson Diversion is located in lower Racetrack Creek above the Interstate Highway 90 and just below Yellowstone Trail. Replacing this diversion, as part of a larger fish passage/in-stream flow scheme for lower Racetrack, will improve spawning habitat access and reduce summer mortality for salmonids throughout the lower six miles of this watershed. This diversion is located approximately two miles above the confluence of Racetrack with the Clark Fork River. Lower Racetrack Creek is one of the most productive fluvial brown trout spawning areas in the entire Upper Clark Fork drainage. Mountain whitefish, westslope cutthroat trout (hybridized genetics) and other salmonids (including bull trout through at least the 1980s) also use the Racetrack drainage.

Opening new aquatic habitat will increase trout access to groundwater-fed temperature refuges upstream and downstream when dewatering and temperature stress peak in July/August, will reduce trout mortality during that period, and also will open new areas to brown trout spawning in October/November. According to an inventory by Trout Unlimited in 2010, three irrigation fish passage barriers restrict trout mobility in the lower watershed. The lowest blocking structure, the Evan Johnston diversion at River mile 0.9, was replaced in fall 2014 with a triple rock weir similar to the structure proposed here. This triple weir structure has performed well since its installation, in terms of geomorphic stability, irrigation efficiency, and passage.

The Carl Johnson diversion is the next barrier upstream, at River mile 2.4. This dam consists of T-posts and tarps and sections of tin roof sealed with plastic sheeting and tarps about 2 feet high. A makeshift headgate of logs and tarps controls ditch flow. This structure is reconstructed every year using heavy equipment in the stream. In high flows almost all fish passage upstream is restricted by the vertical jump of more than two vertical feet from a shallow riffle below the diversion—and smaller fish are completely excluded by the tarps. The new diversion would be a triple rock weir, with each weir crest 0.7 ft above the pool below it. Rock weirs also have small spaces between the rocks which enable smaller fish species and age classes to ascend the structure. The design also provide for a removal stop log in the top weir, so that at high water there are actually only two weirs to ascend, but the irrigator has the option to insert the stop log and raise the water an additional 0.75 feet so that he can successfully divert his water right when water supply is low.

There is one additional diversion at River mile 4.0 which diverts large amounts of water. The Clark Fork Coalition is interested in eventually improving fish passage there as well. These three passage projects in combination with instream flow work being done by the Coalition on Racetrack Creek, should combine to dramatically improve passage and habitat in the lower 4 miles of this FWP priority stream.

D. Length of stream or size of lake that will be treated: Racetrack Creek is 23 miles long.

E. Project Budget:

Grant Request (Dollars): \$ 23,680

Contribution by Applicant (Dollars): \$ 2000 In-kind \$ 1250
(salaries of government employees are not considered as matching contributions)

Contribution from other Sources (Dollars): \$ 10,300 In-kind \$
(attach verification - See page 2 budget template)

Total Project Cost: \$ **\$37,230**

- F. Attach itemized (line item) budget – see template
- G. Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).
- H. Attach land management and maintenance plans that will ensure protection of the reclaimed area.

III. PROJECT BENEFITS*

- A. What species of fish will benefit from this project?:

Brown trout, mountain whitefish, westslope cutthroats (not pure), longnose sucker, slimy sculpin.

- B. How will the project protect or enhance wild fish habitat?:

The project will enhance wild trout habitat by providing upstream and downstream fish passage between the lower and middle portions of Racetrack Creek drainage. It is part of an integrated fish passage, habitat and in-stream flow restoration effort on Racetrack Creek involving WRC, Clark Fork Coalition, and landowners.

- C. Will the project improve fish populations and/or fishing? To what extent?:

We expect the project to reduce mortality of trout during high water temperature stress conditions in late summer, and improve access of fluvial brown trout to under-utilized spawning grounds in middle Racetrack Creek. In combination with associated passage and in-stream flow projects, the impact on populations could be substantial.

- D. Will the project increase public fishing opportunity for wild fish and, if so, how?:

We hope to see an increase in fluvial brown trout utilization of this reach of Racetrack Creek for spawning. This could increase brown trout populations in the Upper Clark Fork since Racetrack Creek is such an important spawning stream for fluvial browns. Limited habitat in lower Racetrack (due to barriers) has led to superimposition of redds in the past.

- E. If the project requires maintenance, what is your time commitment to this project?:

The landowner, Carl Johnson, will do all needed maintenance on the project. He is familiar with the maintenance of irrigation diversion structures and headgates and has inspected his neighbor's diversion which is similar.

What was the cause of habitat degradation in the area of this project and how will the project

- F. correct the cause?:

Racetrack Creek has good water quality and some excellent habitat in its lower six miles. The limitations are dewatering in mid- to late summer and elevated water temperatures. Since other projects are addressing the in-stream flow issue, this project will build on those efforts by providing fish passage to access all of the habitat features for 1.6 miles upstream (to Berg diversion) and downstream to the groundwater-fed lower portion of the creek (cold water refuge habitat).

- G. What public benefits will be realized from this project?:
-

The public can benefit from better survival of resident brown trout and other salmonids and native fish in the lower Racetrack watershed, and from potential improved production of fluvial brown trout which are accessing a larger habitat area and recruiting sport fish to the Clark Fork river.

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No.

I. Will the project result in the development of commercial recreational use on the site?: (explain):

No. The water right holder, C. Johnson, irrigates from Racetrack Creek, but his property does not actually bound Racetrack Creek at any point.

J. Is this project associated with the reclamation of past mining activity?:

No.

Each approved project sponsor must enter into a written agreement with the Department specifying terms and duration of the project.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature:

Carl A. Johnson

Date:

11-30-16

Sponsor (if applicable):

*Highlighted boxes will automatically expand.

Mail To:

Montana Fish, Wildlife & Parks
Habitat Protection Bureau
PO Box 200701
Helena, MT 59620-0701

Incomplete or late applications will be returned to applicant.

Applications may be rejected if this form is modified.

Applications may be submitted at anytime, but must be received by the Future Fisheries Program office in Helena before December 1 and June 1 of each year to be considered for the subsequent funding period.

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables must be completed or the application will be returned

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
Personnel***								
Survey				\$ 1,500.00	800.00		700.00	\$ 1,500.00
Design				\$ -				\$ -
Engineering				\$ 7,000.00			7,000.00	\$ 7,000.00
Permitting				\$ 400.00	400.00			\$ 400.00
Oversight				\$ 1,200.00	600.00		600.00	\$ 1,200.00
				\$ -				\$ -
			Sub-Total	\$ 10,100.00	\$ 1,800.00	\$ -	\$ 8,300.00	\$ 10,100.00
Travel								
Mileage				\$ 200.00	200.00			\$ 200.00
Per diem				\$ -				\$ -
			Sub-Total	\$ 200.00	\$ 200.00	\$ -	-	\$ 200.00
Construction Materials****								
Imported embankment material	28 cubic yard		\$25.00	\$ 700.00	300.00	400.00		\$ 700.00
Reinforced concrete cast in place	9 cubic yards		\$600.00	\$ 5,400.00	5,400.00			\$ 5,400.00
36" angular rock	64 cubic yards		\$95.00	\$ 6,080.00	6,080.00			\$ 6,080.00
18" to 24" rock	10 cubic yards		\$85.00	\$ 850.00		850.00		\$ 850.00
Modular Steel headgate w wingwalls	1 lump sum		\$4,000.00	\$ 4,000.00	-	2,000.00	2,000.00	\$ 4,000.00
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
			Sub-Total	\$ 17,030.00	\$ 11,780.00	\$ 3,250.00	\$ 2,000.00	\$ 17,030.00
Equipment and Labor								
Trakhoe Excavator w thumb	3 days		\$1,600.00	\$ 4,800.00	4,800.00			\$ 4,800.00
Dump truck	2 days		\$800.00	\$ 1,600.00	1,600.00			\$ 1,600.00
Assemble steel channel for stop log and drill rock	1 lump sum		\$1,000.00	\$ 1,000.00	1,000.00			\$ 1,000.00
				\$ -				\$ -

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

				\$	-				\$	-
				\$	-				\$	-
			Sub-Total	\$	7,400.00	\$	-	\$	-	7,400.00
Mobilization										
Mobilize equipment	1	lump sum	\$2,500.00	\$	2,500.00				\$	-
				\$	-				\$	-
				\$	-				\$	-
				\$	-				\$	-
				\$	-				\$	-
			Sub-Total	\$	2,500.00	\$	-	\$	-	2,500.00
			TOTALS	\$	37,230.00	\$	23,680.00	\$	10,300.00	37,230.00

OTHER REQUIREMENTS:

All of the columns in the budget table and the matching contribution table **MUST** be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used for calculations). Describe here or in text.

Reminder: Government salaries cannot be used as in-kind match

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of \$1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Cost of Engineering and Oversight exceeds 15% because this is a small project with simple materials. The CFC has taken the majority burden of financing the engineering

MATCHING CONTRIBUTIONS (do not include requested funds)

CONTRIBUTOR	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
Clark Fork Coalition	\$ -	\$ 10,300.00	\$ 10,300.00	yes
Carl Johnson, irrigator	\$ 3,250.00	\$ -	\$ 3,250.00	yes
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
TOTALS	\$ 3,250.00	\$ 10,300.00	\$ 13,550.00	

29 November, 2016

Montana Fish, Wildlife & Parks
Future Fisheries Program, Attn: Michelle McGree
PO Box 200701
Helena, MT 59620

RE: Support for the Johnson Diversion Replacement Project on Racetrack Creek.

I am an irrigator on Racetrack Creek, south of Deer Lodge, in Powell County, Montana. I have been working with the Clark Fork Coalition to develop a new irrigation diversion for my water rights on Racetrack. The new diversion is being designed by Ryan Elliot of Great West Engineering, whom I have met onsite to discuss the project.

The new diversion design looks very good to me, and I am eager to move forward on this project. A new diversion and head gate will improve my ability to divert my water right, improve control of the amount of water I am diverting, and will be much safer and require less labor than my current system of annually reconstructing my diversion, often in high water. A new diversion will also provide fish an opportunity to pass through the structure, which is a benefit for conservation of the resource.

I will try to attend the Future Fisheries panel but there is a cattle sale that day in Missoula which I usually attend, so we will see how that works out. Thank you for your consideration.

A handwritten signature in black ink that reads "Carl Johnson". The signature is written in a cursive, flowing style.

Carl Johnson
Deer Lodge, MT
406-560-0460 cell



November 28, 2016

Montana Fish, Wildlife & Parks
Future Fisheries Program, Attn: Michelle McGree
PO Box 200701
Helena, MT 59620

RE: Support for the Johnson Diversion Replacement Project on Racetrack Creek.

Michelle:

I would like to offer my support for the Johnson Diversion Replacement Project on Racetrack Creek proposed by Carl Johnson and the Clark Fork Coalition. Based on studies conducted by FWP in coordination with the Natural Resource Damage Program, Racetrack Creek has been identified as a high priority stream for fishery restoration. It is a major tributary to the upper Clark Fork River and the lower reaches provide important spawning and rearing habitat for brown trout and other sport and native fish species. Past radio telemetry work has documented a number of radio tagged brown trout spawning in the lower reach of Racetrack Creek near where this project would take place. Providing for fish passage as well as lowering entrainment is important in this segment of the stream. Please feel free to contact me with any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jason Lindstrom". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jason Lindstrom
Fisheries Biologist
Montana Fish, Wildlife & Parks
P.O. Box 24
Anaconda, MT 59711

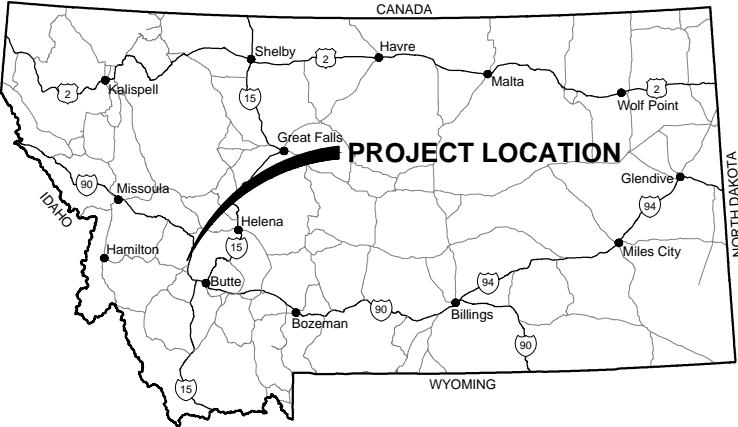
Phone: (406) 529-8058
Email: jlindstrom@mt.gov



SHEET INDEX

PROJECT: 1-16193
DATE: NOVEMBER 18,2016

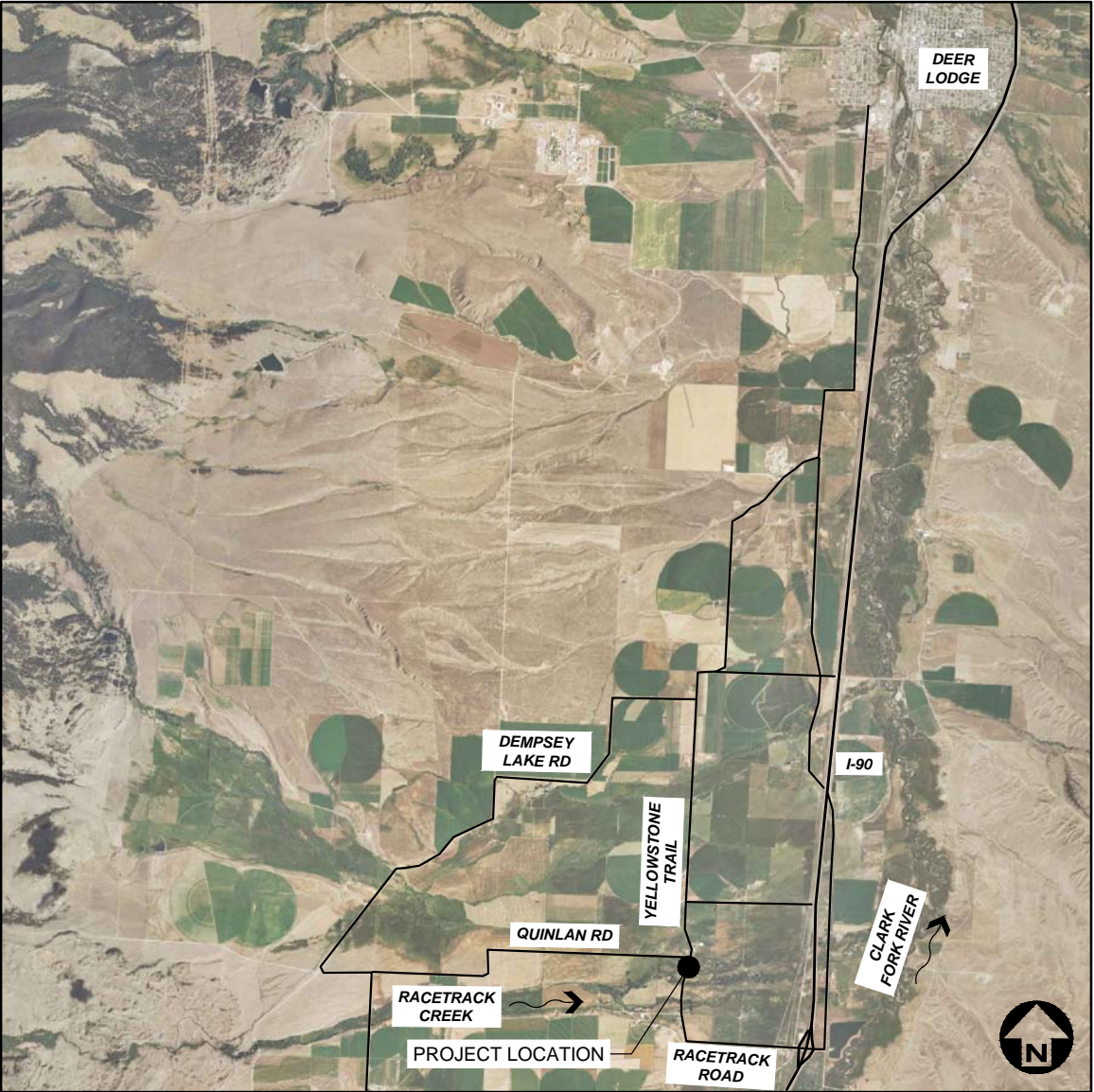
SHEET 1	COVER
SHEET 2	LEGEND & GENERAL NOTES
SHEET 3	OVERALL SITE PLAN & CONTROL DIAGRAM
SHEET 4	DIVERSION PLAN & PROFILE
SHEET 5	DIVERSION DETAILS
SHEET 6	NEW DITCH & HEADGATE PLAN AND PROFILE
SHEET 7	HEADGATE DETAILS



CLARK FORK COALITION LOWER RACETRACK CREEK DIVERSION

90% REVIEW SET

SECTION 18, TOWNSHIP 6N, AND RANGE 9W



NOT TO SCALE

PLANS PREPARED FOR:

CLARK FORK COALITION



PREPARED BY:

RYAN ELLIOTT, P.E.
GREAT WEST ENGINEERING



NO.	REVISION DESCRIPTION	BY	DATE	SET NO.
△				1
△				
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△				SHEET NO.

ABBREVIATIONS

⊙	AT	LPG	LIQUID PROPANE GAS
Δ	ANGLE OF DEFLECTION, DELTA ANGLE	LT	LEFT
◁PT	ANGLE POINT	MAX	MAXIMUM
AB	ANCHOR BOLT	MD	MEASURE DOWN
ABDN	ABANDON	MFD	MANUFACTURED
AC	ASBESTOS CONCRETE	MFR	MANUFACTURE, MANUFACTURER
ADDN	ADDITIONAL	MH	MANHOLE
ADJ	ADJACENT	MIN	MINIMUM
AFF	ABOVE FINISHED FLOOR	MISC	MISCELLANEOUS
ALT	ALTERNATE	MJ	MECHANICAL JOINT
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	MOV	MOTOR OPERATED VALVE
APPROX	APPROXIMATE	MPWSS	MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
APVD	APPROVED	N	NORTH
ARCH	ARCHITECTURE, ARCHITECTURAL	NE	NORTHEAST
ASPH	ASPHALT	NG	NATURAL GAS
AVE	AVENUE	NIC	NOT IN CONTRACT
AVG	AVERAGE	NO	NUMBER
BFV	BUTTERFLY VALVE	NOM	NOMINAL
BLDG	BUILDING	NTS	NOT TO SCALE
BLK	BLOCK	NW	NORTHWEST
BLVD	BOULEVARD	OC	ON CENTER
BM	BEAM, BENCHMARK	OD	OUTSIDE DIAMETER
BOT	BOTTOM	OF	OVERFLOW
BRG	BEARING	OH	OVERHEAD
BRKT	BRACKET	OHP	OVERHEAD POWER
BVC	BEGIN VERTICAL CURVE	OHT	OVERHEAD TELEPHONE
C-C	CENTER TO CENTER	OPNG	OPENING
CHAN	CHANNEL	PC	POINT OF CURVATURE
CHK	CHECK	PCC	POINT OF COMPOUND CURVATURE
CI	CAST IRON	PE	PLAIN END, POLYETHYLENE
CIPC	CAST-IN-PLACE CONCRETE	PERP	PERPENDICULAR
CIRC	CIRCULAR	PI	POINT OF INTERSECTION
CJ	CONSTRUCTION JOINT, CONTROL JOINT	PL	PROPERTY LINE
CL	CENTER LINE	PNL	PANEL
CLR	CLEAR, CLEARANCE	PRC	POINT OF REVERSE CURVATURE
CMP	CORRUGATED METAL PIPE	PREFAB	PREFABRICATED
CMU	CONCRETE MASONRY UNITS	PRELIM	PRELIMINARY
CO	CLEANOUT	PREP	PREPARE, PREPARATION
COL	COLUMN	PROP	PROPERTY
CONC	CONCRETE	PRV	PRESSURE REDUCING VALVE
CONSTR	CONSTRUCTION	PSF	POUNDS PER SQUARE FOOT
CONT	CONTINUE, CONTINUED, CONTINUOUS	PSI	POUNDS PER SQUARE INCH
CONTR	CONTRACTOR	PT	POINT, POINT OF TANGENCY
COORD	COORDINATE	PVC	POLYVINYL CHLORIDE
CP	CONTROL PANEL, CONTROL POINT	PVI	POINT OF VERTICAL INTERSECTION
CPLG	COUPLING	PVMT	PAVEMENT
CTR	CENTER	R, RAD	RADIUS
CTV	CABLE TELEVISION	RC	REINFORCED CONCRETE
CU	CUBIC, COPPER	RCP	REINFORCED CONCRETE PIPE
CF	CUBIC FEET	RD	ROAD
CULV	CULVERT	RDCR	REDUCER
CY	CUBIC YARD	REBAR	REINFORCEMENT BAR
DET	DETAIL	REF	REFERENCE
DI	DUCTILE IRON, DRAIN INLET	REINF	REINFORCE
DIA, ∅	DIAMETER	REQD	REQUIRED
DIAG	DIAGONAL	RR	RAILROAD
DIM	DIMENSION	RST	REINFORCING STEEL
DR	DRIVE	RT	RIGHT
DWG	DRAWING	R/W	RIGHT-OF-WAY
E	EAST	S	SOUTH, SANITARY SEWER
EA	EACH	SAN	SANITARY
EL, ELEV	ELEVATION	SCH	SCHEDULE
ELB	ELBOW	SD	STORM DRAIN
ELEC	ELECTRIC, ELECTRICAL	SDWK	SIDEWALK
ENCL	ENCLOSE	SE	SOUTHEAST
ENGR	ENGINEER	SECT	SECTION
EOP	EDGE OF PAVEMENT	SF	SQUARE FOOT
EQ	EQUAL, EQUALLY	SHT	SHEET
EQ SP	EQUALLY SPACED	SIM	SIMILAR
EQUIP	EQUIPMENT	SLP	SLOPE
EQUIV	EQUIVALENT	SPEC	SPECIFICATION
EVC	END VERTICAL CURVE	SQ	SQUARE
EW	EACH WAY	SSTL	STAINLESS STEEL
EXC	EXCAVATE	STA	STATION
EXP	EXPANSION	SS	SANITARY SEWER SERVICE
EXP JT	EXPANSION JOINT	STD	STANDARD
EXST	EXISTING	ST	STREET
FCV	FLOW CONTROL VALVE	STL	STEEL
FD	FLOOR DRAIN	STRUCT	STRUCTURE
FDN	FOUNDATION	SW	SOUTHWEST
FES	FLARED END SECTION	SYM	SYMMETRICAL
FET	FLARED END TERMINAL	TB	THRUST BLOCK
FF	FINISHED FLOOR	TBC	TOP BACK OF CURB
FG	FINISH GRADE	TBM	TEMPORARY BENCH MARK
FHYD	FIRE HYDRANT	TEL	TELEPHONE
FJ	FLANGE JOINT	TEMP	TEMPORARY
FL	FLOW LINE	THRU	THROUGH
FLEX	FLEXIBLE	TYP	TYPICAL
FM	FORCEMAIN	UG	UNDERGROUND
FT	FOOT, FEET	UGP	UNDERGROUND POWER
FO	FIBER OPTIC	UGT	UNDERGROUND TELEPHONE
FTG	FOOTING, FITTING	UTIL	UTILITY
G	NATURAL GAS	V	VALVE, VOLT
GA	GAGE, GAUGE	VB	VALVE BOX
GAL	GALLON	VERT	VERTICAL
GALV	GALVANIZED	VOL	VOLUME
GND	GROUND	W	WEST, WATER
GVL	GRAVEL	WTR	WATER
HB	HOSE BIB	WD	WOOD
HDPE	HIGH DENSITY POLYETHYLENE	W/O	WITHOUT
HOR, HORIZ	HORIZONTAL	WL	WETLAND
HWY	HIGHWAY	WM	WIRE MESH, WATER METER
HYD	HYDRANT	WS	WATERSTOP, WATER SURFACE, WATER SERVICE
ID	INSIDE DIAMETER	WT	WEIGHT
IE	INVERT ELEVATION	WV	WATER VALVE
IN	INCH	WWF	WELDED WIRE FABRIC
INV	INVERT	WWM	WELDED WIRE MESH
JB	JUNCTION BOX	XFMR	TRANSFORMER
JT	JOINT	X-ING	CROSSING
K	RATE OF VERTICAL CURVATURE	XS	CROSS SECTION
LBS	POUNDS	YD	YARD
LF	LINEAR FEET		
LN	LANE		

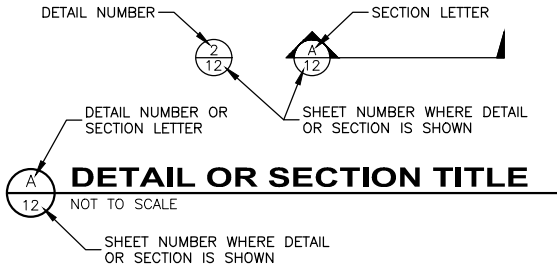
LEGEND

EXISTING	PROPOSED	DESCRIPTION	EXISTING	PROPOSED	DESCRIPTION
		MAJOR CONTOUR			STUMP
		MINOR CONTOUR			SHRUB/BUSH
		OVERHEAD TELEPHONE			TREE-CONIFER
		UNDERGROUND TELEPHONE			TREE-DECIDUOUS
		CABLE TELEVISION			TREE LINE
		FIBER OPTIC			COMMUNICATION MANHOLE
		NATURAL GAS			COMMUNICATION VAULT
		OVERHEAD POWER			TELEPHONE RISER
		UNDERGROUND POWER			CABLE TV RISER
		SANITARY SEWER			NATURAL GAS METER
		SANITARY SEWER SERVICE			NATURAL GAS RISER
		SANITARY SEWER FORCEMAIN			NATURAL GAS VALVE
		STORM DRAIN			LIGHT POLE
		STORM CULVERT			STREET LIGHT POLE
		WATER			POWER RISER
		WATER SERVICE			PAD MOUNTED TRANSFORMER
		CHAINLINK FENCE			POWER VAULT
		BARBED WIRE FENCE			UTILITY POLE
		WOOD FENCE			GUY WIRE
		PAVED ROAD			SANITARY MANHOLE
		GRAVEL ROAD			SANITARY CLEANOUT
		PROPERTY/LOT LINE			SANITARY LAMPHOLE
		PROPERTY EASEMENT			STORM MANHOLE
		PROPERTY SETBACK			STORM ROUND INLET
		RIGHT-OF-WAY			STORM SQUARE INLET
		CITY LIMIT/DISTRICT BOUNDARY			STORM CATCH BASIN
		RAILROAD			11.25° ELBOW
		DITCH			22.50° ELBOW
		WATER EDGE			45° ELBOW
		WETLAND			90° ELBOW
		BUILDING			TEE
		BENCHMARK			CROSS
		CONTROL POINT			CAP
		PROPERTY PIN			FIRE HYDRANT
		BORING			GATE VALVE
		MONITORING WELL			REDUCER
		TEST PIT			WATER METER
		BOLLARD			WELL
		MAIL BOX			CURB STOP
		SIGN			FROST FREE HYDRANT

GENERAL NOTES:

- THIS IS A STANDARD LEGEND AND ABBREVIATION LIST. THEREFORE, NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED ON THIS PROJECT.
- UNLESS MODIFIED BY THE CONTRACT DOCUMENTS, ALL WORK WILL CONFORM TO THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS, SIXTH EDITION, APRIL 2010 (REFERRED TO COLLECTIVELY AS MPWSS).
- EXISTING UNDERGROUND UTILITIES SHOWN ARE FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS APPROXIMATE AND MAY BE INCOMPLETE. FOR ACCURATE LOCATION, THE CONTRACTOR SHALL CONTACT, PRIOR TO EXCAVATION, THE UTILITIES UNDERGROUND LOCATION CENTER AT: 1-800-424-5555.

GENERAL DESIGN DESIGNATIONS:



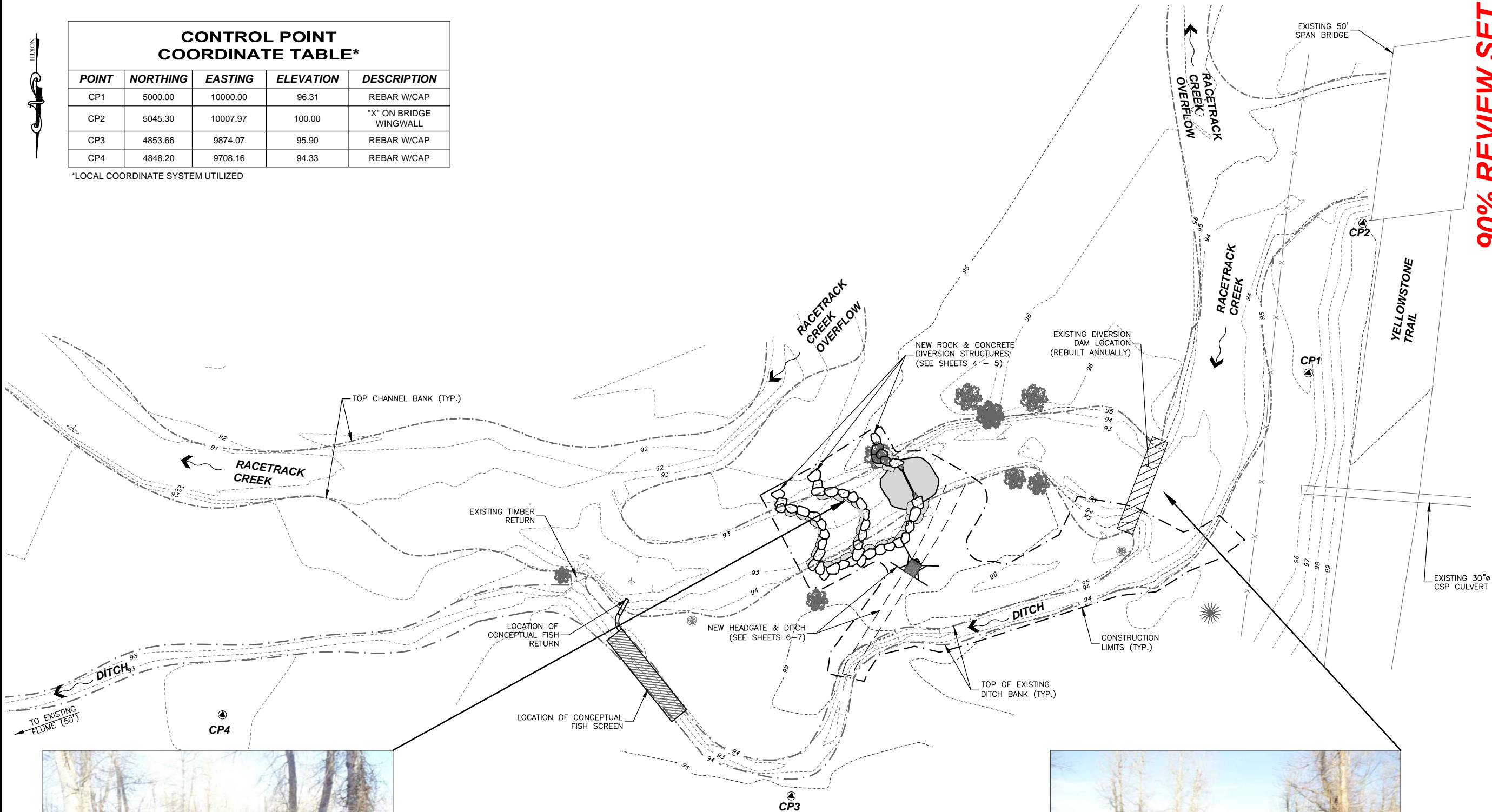
90% REVIEW SET

DATE					
BY					
REVISION DESCRIPTION					
NO.	◁	◁	◁	◁	◁
PROJECT: 1-16193	DESIGNED: RME	DRAWN: RME	CHECKED: ---	APPROVED: ---	DATE: NOVEMBER 18, 2016
 Great West Engineering® 2501 BELT VIEW DRIVE HELENA, MT 59601 (406) 449-6627					
CLARK FORK COALITION LOWER RACETRACK CREEK DIVERSION LEGEND & GENERAL NOTES					
SHEET NO. 2 OF 7					



CONTROL POINT COORDINATE TABLE*				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP1	5000.00	10000.00	96.31	REBAR W/CAP
CP2	5045.30	10007.97	100.00	"X" ON BRIDGE WINGWALL
CP3	4853.66	9874.07	95.90	REBAR W/CAP
CP4	4848.20	9708.16	94.33	REBAR W/CAP

*LOCAL COORDINATE SYSTEM UTILIZED

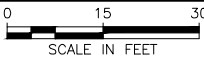


VIEW OF RACETRACK CREEK AT PROPOSED DIVERSION
STRUCTURE LOCATION (LOOKING DOWNSTREAM)



VIEW OF RACETRACK CREEK AT EXISTING DIVERSION
STRUCTURE LOCATION (LOOKING DOWNSTREAM)

OVERALL SITE PLAN & CONTROL DIAGRAM



90% REVIEW SET

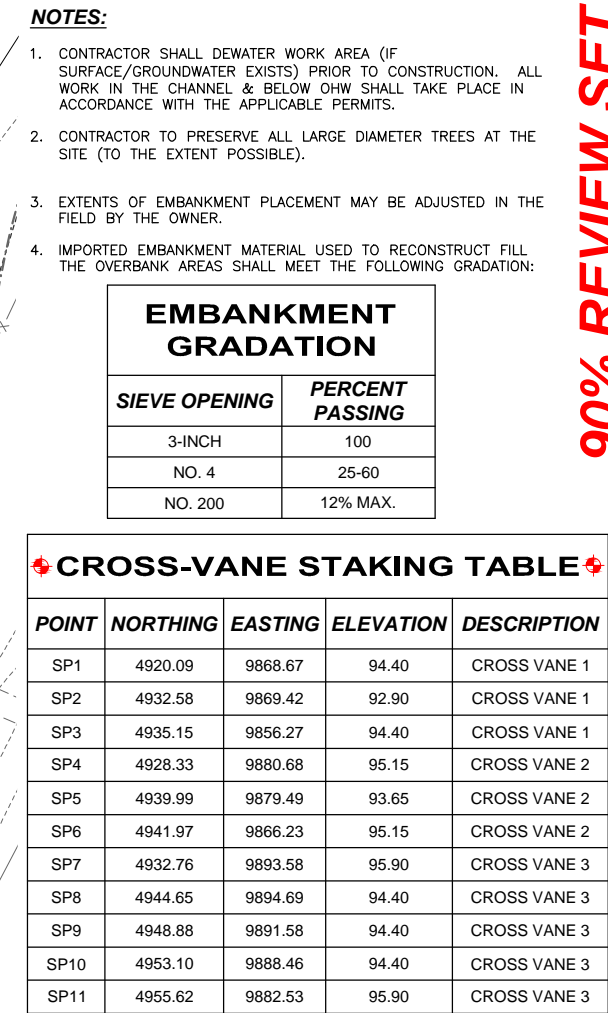
NO.	REVISION DESCRIPTION	BY	DATE

PROJECT: 1-16193	DESIGNED: RME
DRAWN: RME	CHECKED: ---
APPROVED: ---	DATE: NOVEMBER 18, 2016



CLARK FORK COALITION
LOWER RACETRACK CREEK DIVERSION
OVERALL SITE PLAN & CONTROL DIAGRAM

F:\1-16193-CFC Lower Racetrack Creek Diversion\CADD 1-16193-Sheets\1-16193-03-OverallIPP.dwg



90% REVIEW SET

PROJECT:	1-16193
DESIGNED:	RME
DRAWN:	RME
CHECKED:	---
APPROVED:	---
DATE:	NOVEMBER 18, 2016
NO.	1
REVISION DESCRIPTION	
BY	
DATE	

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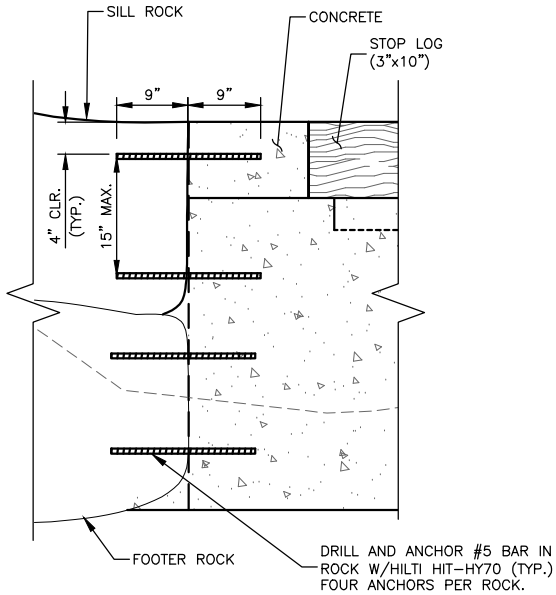


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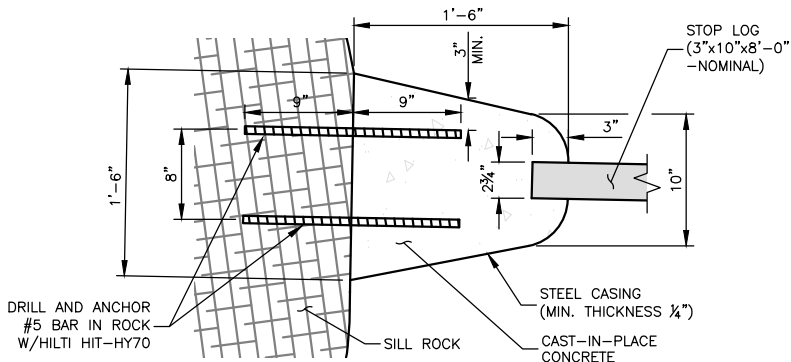
CLARK FORK COALITION

LOWER RACETRACK CREEK DIVERSION

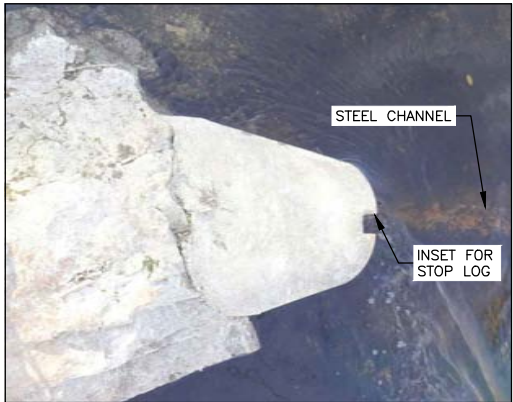
DIVERSION DETAILS



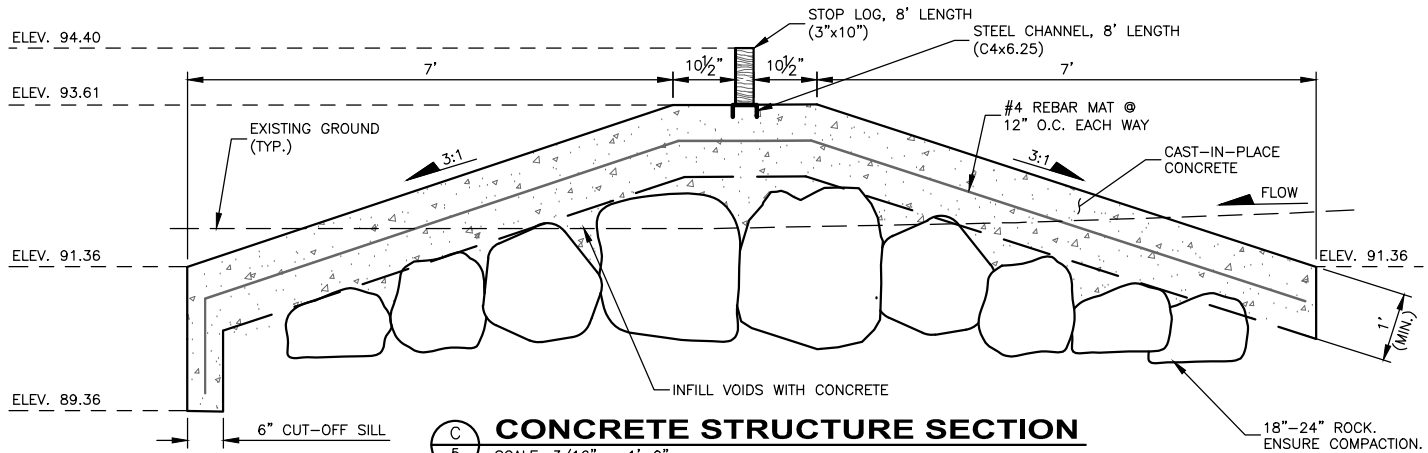
**ELEVATION VIEW
ROCK CONNECTION**
SCALE: 1/2" = 1'-0"



PLAN VIEW - ROCK CONNECTION
SCALE: 3/4" = 1'-0"



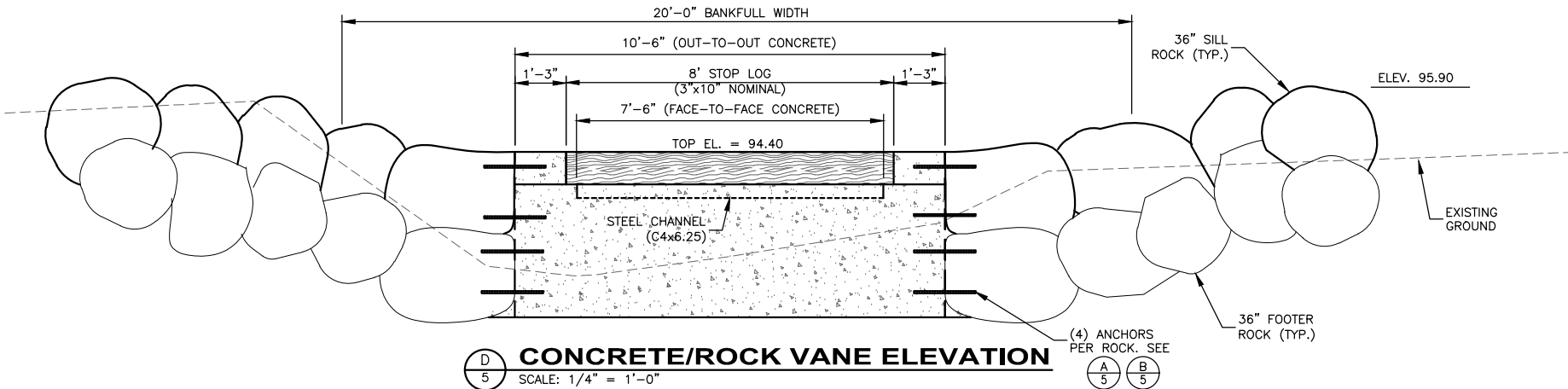
**SIMILAR ROCK
CONNECTION DETAIL**



CONCRETE STRUCTURE SECTION
SCALE: 3/16" = 1'-0"

CROSS-VANE STRUCTURE NOTES:

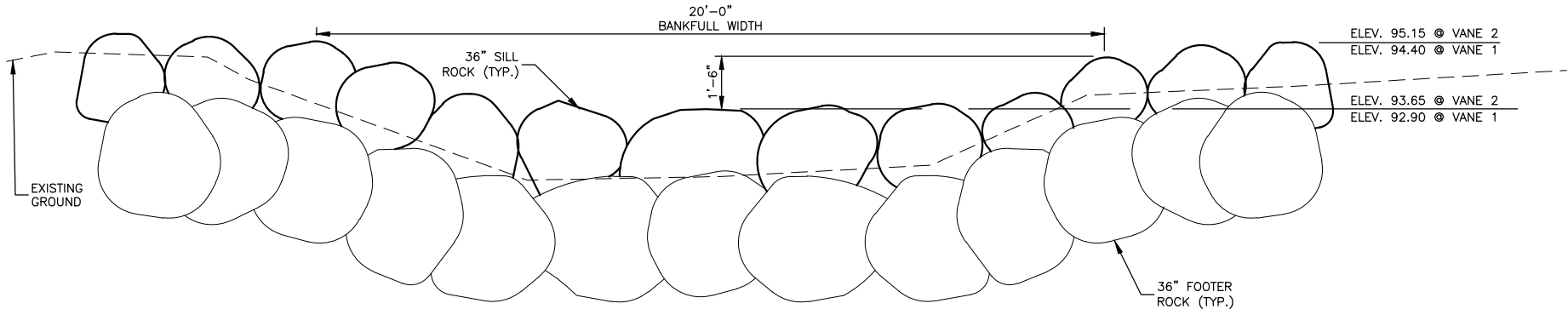
1. IN ALL OF THE CROSS-VANE ROCK STRUCTURES, MINIMIZE GAPS BETWEEN FOOTER ROCKS. BACKFILL SIDES OF FOOTER ROCKS WITH NATIVE STREAMBED MATERIAL.
2. **CROSS-VANES 1 & 2:** PROVIDE 1 ROW OF FOOTER ROCKS ON DOWNSTREAM SIDE OF THE SILL ROCKS, **CROSS-VANES 3:** PROVIDE 2 ROWS OF FOOTER ROCKS UNDER THE SILL ROCK.
3. **ALL CROSS VANES:** PLACE SILL ROCKS TIGHTLY TOGETHER AS SHOWN ACROSS THE LENGTH OF THE STRUCTURE.
4. AVERAGE ROCK FOR THE STRUCTURES SHALL BE 36". MINIMUM B-AXIS OF ROCKS SHALL BE 24".
5. CUTOUT STEEL CHANNEL AS NECESSARY IN THE STEEL CASING AREA.



CONCRETE/ROCK VANE ELEVATION
SCALE: 1/4" = 1'-0"



SIMILAR CONCRETE/ROCK CROSS-VANE



ROCK CROSS-VANE ELEVATION
SCALE: 1/4" = 1'-0"



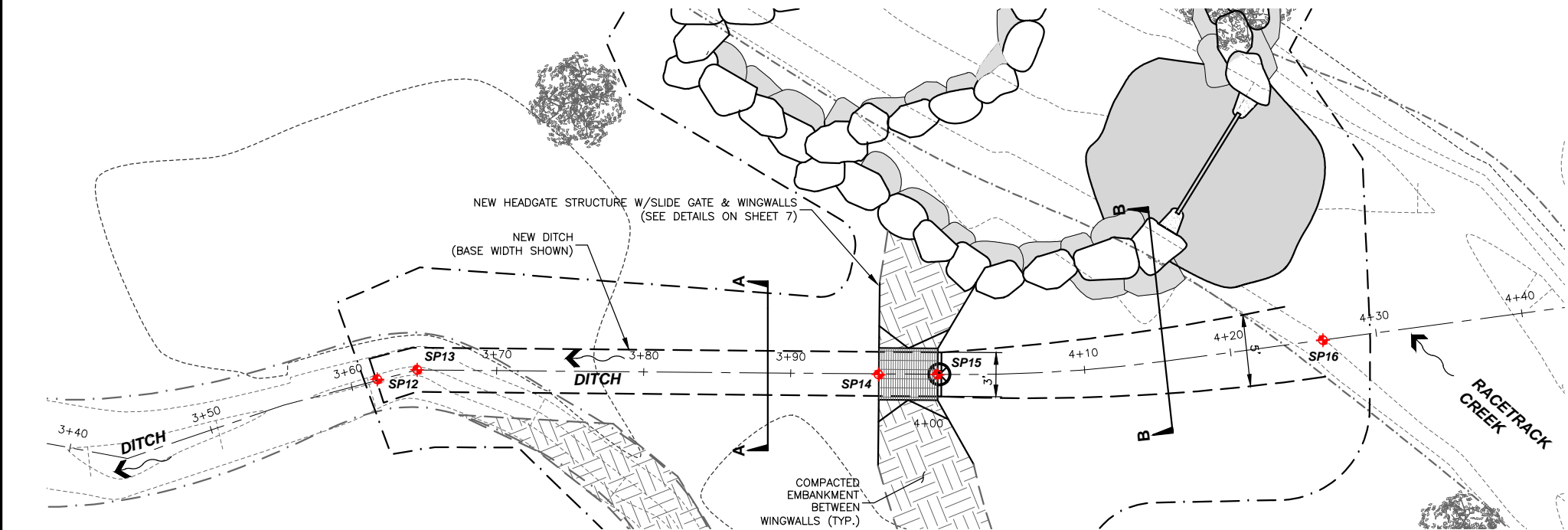
SIMILAR ROCK CROSS-VANE

90% REVIEW SET

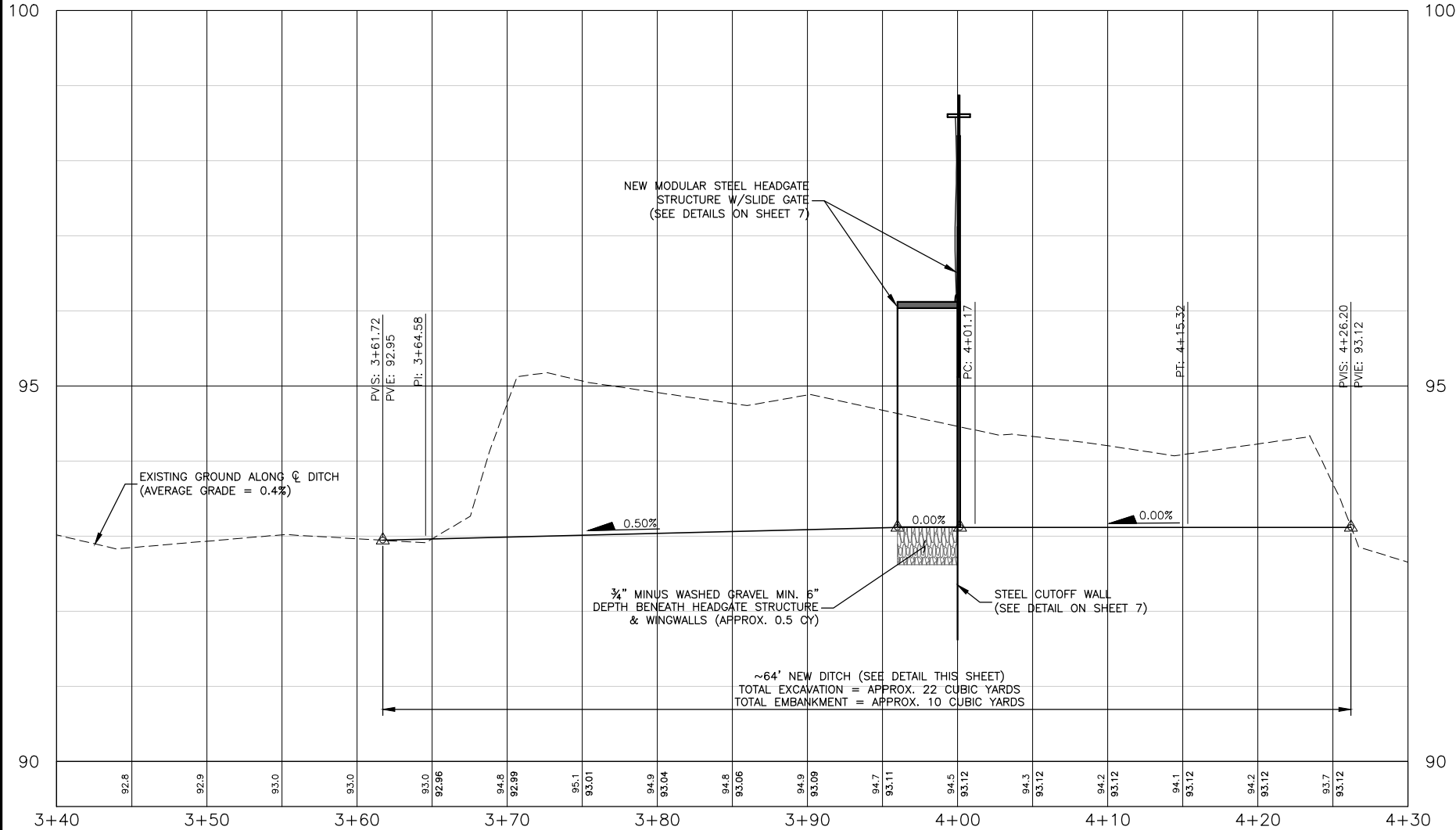
NOTES:

- 1. CONTRACTOR SHALL UTILIZE SATISFACTORY STRUCTURE EXCAVATION MATERIAL FOR BACKFILL MATERIAL. BRING LIFTS OF BACKFILL UP EQUALLY ON EACH SIDE OF HEADGATE WALLS & WINGWALLS (12" MAXIMUM).
- 2. NATIVE MATERIAL BELOW THE HEADGATE AND ALL BACKFILL SHALL BE COMPACTED WITH MECHANICAL TAMPERS UNTIL SURFACE DEFORMATION IS NO LONGER VISIBLE. ADJUST THE MOISTURE CONTENT OF THE MATERIAL TO A MOISTURE CONTENT SUITABLE FOR COMPACTION.

DITCH & HEADGATE STAKING TABLE				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
SP12	4890.88	9884.07	92.95	STA. 3+61.72 BEGIN DITCH
SP13	4893.71	9884.43	92.96	STA. 3+46.58 PI
SP14	4922.75	9896.44	93.12	STA. 3+96.00 HEADGATE INVERT, D/S BTM
SP15	4926.44	9897.97	93.12	STA. 4+00.00 HEADGATE INVERT, U/S BTM
SP16	4951.26	9905.53	93.12	STA. 4+26.24 END DITCH

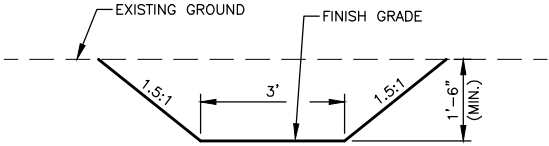


PLAN VIEW OF HEADGATE & DITCH - STA. 3+30 TO STA. 4+30



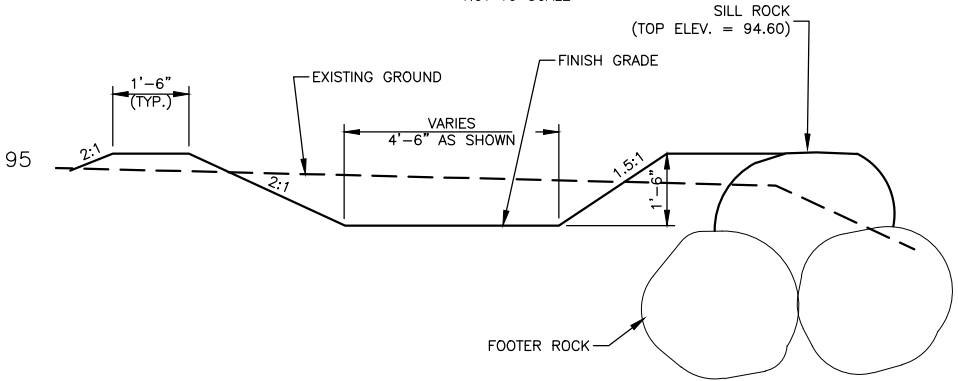
PROFILE VIEW OF HEADGATE & DITCH - STA. 3+40 TO STA. 4+30

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 2'



SECTION A-A : TYP. DITCH SECTION

STA. 3+61.72 TO STA. 3+96.00
NOT TO SCALE



SECTION B-B : TYP. DITCH SECTION

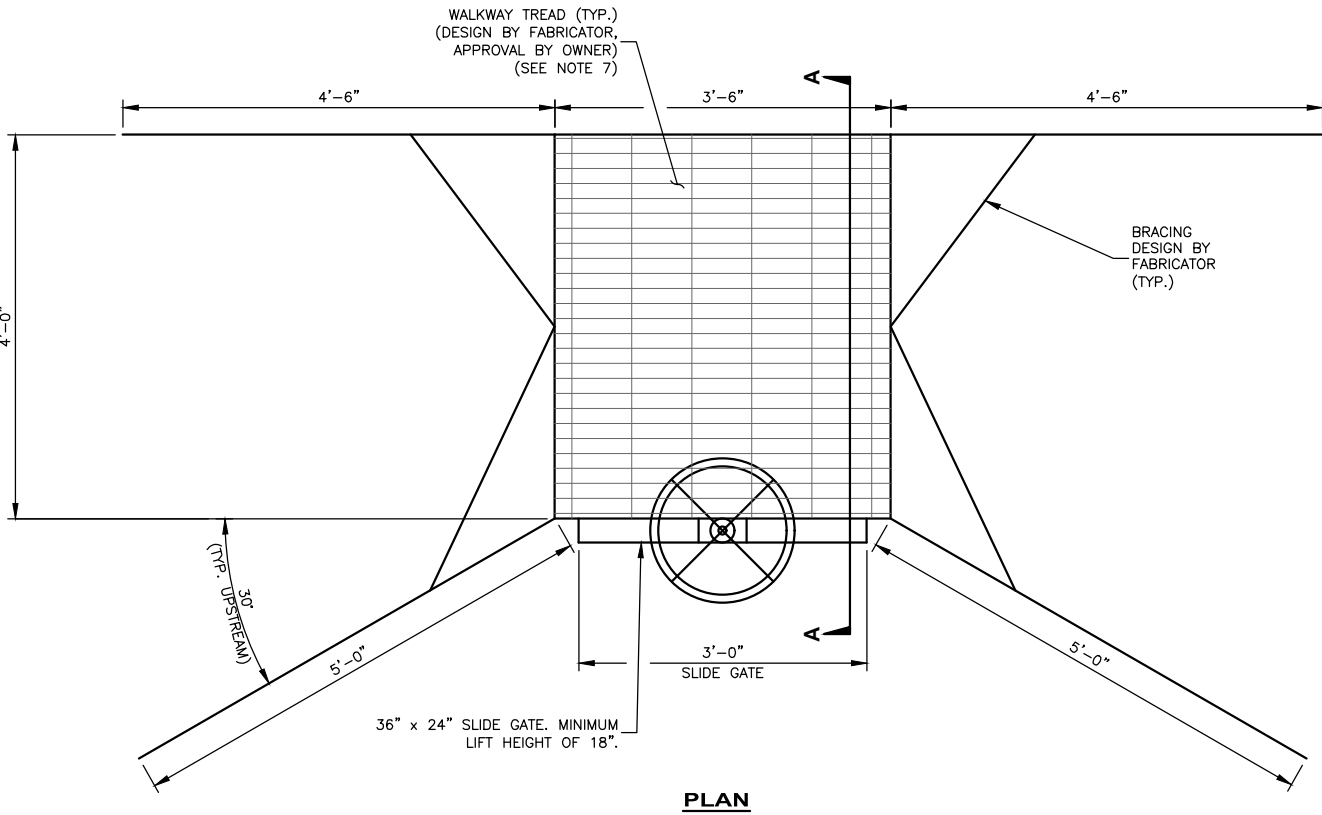
STA. 4+00 TO STA. 4+26.20
NOT TO SCALE



CLARK FORK COALITION
LOWER RACETRACK CREEK DIVERSION
NEW DITCH & HEADGATE PLAN AND PROFILE

SHEET NO.

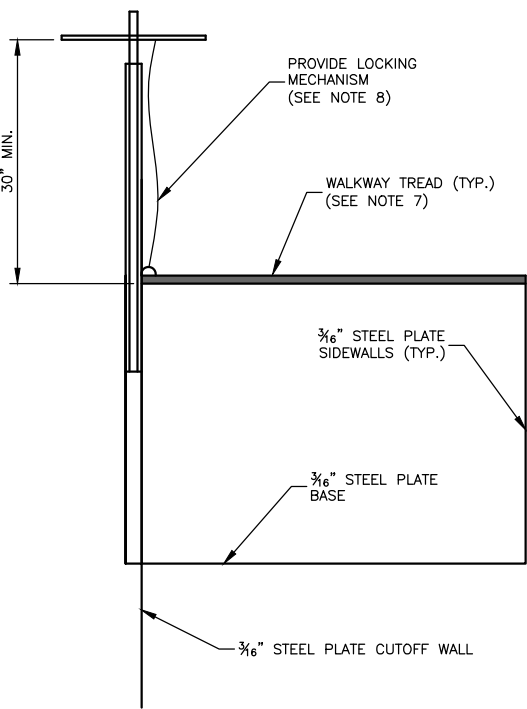
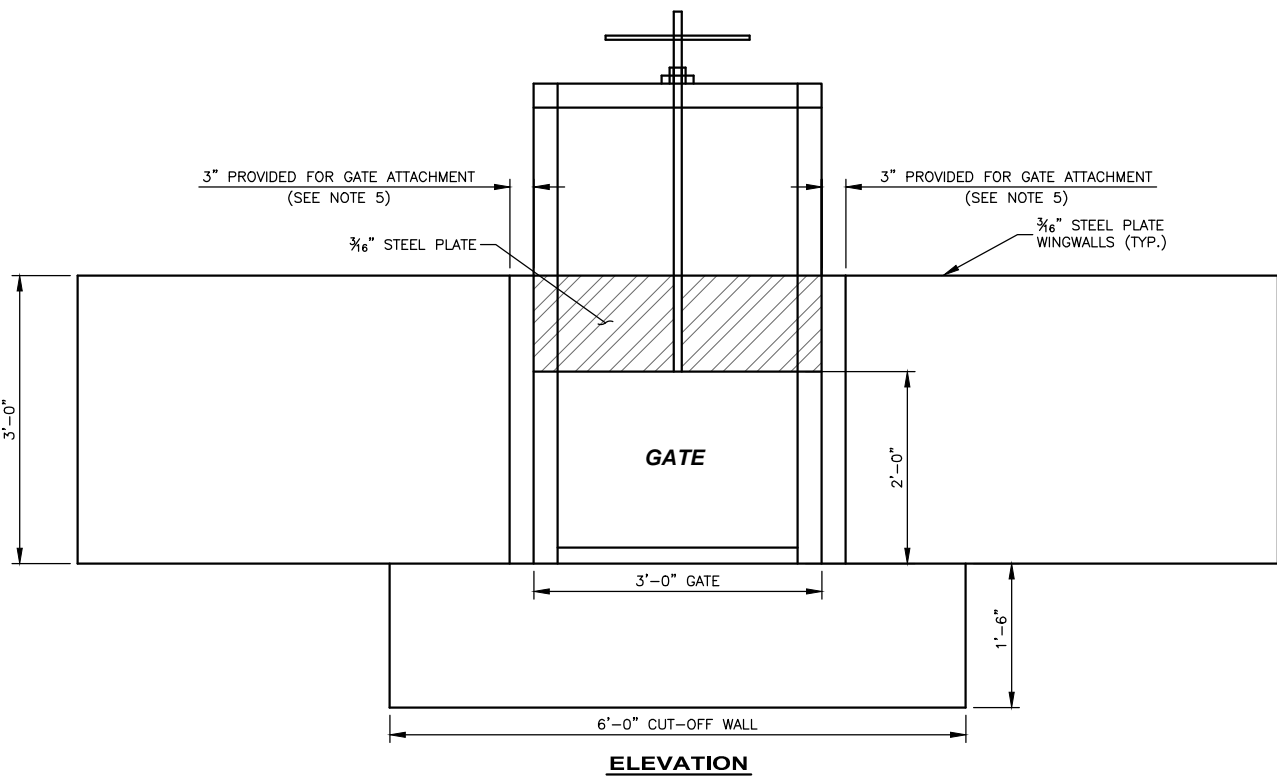
90% REVIEW SET



ELEVATION VIEW OF SIMILAR HEADGATE STRUCTURE



ELEVATION VIEW OF SIMILAR HEADGATE STRUCTURE



- HEADGATE NOTES:**
1. ALL PLATE STEEL SHALL BE 3/8" THICK, A36.
 2. TO ALLOW EASE OF TRANSPORT TO THE SITE, THE WINGWALLS SHALL BE SEPARATE MEMBERS TO ALLOW BOLTED OR WELDED CONFIGURATION TO HEADGATE BOX. BOLTING CONFIGURATION AND PATTERN TO BE DESIGNED BY FABRICATOR. WELDING CONFIGURATION TO BE DESIGNED BY FABRICATOR. IF FIELD WELDED, PAINT ALL WELDED AREAS AFTER COMPLETE.
 3. FINISH GRADE ELEVATIONS SHOWN ON SHEET 6.
 4. NEW HEADGATE SHALL BE CONNECTED PER THE MANUFACTURER'S RECOMMENDATIONS. HEADGATE SHALL BE PAINTED TO RESIST CORROSION. THE HANDWHEEL SHALL EXTEND A MINIMUM OF 30" ABOVE THE TOP OF THE WALKWAY TREAD.
 5. GATE ATTACHMENT DIMENSION MAY VARY. DEPENDENT ON FABRICATOR AND HEADGATE SUPPLIER.
 6. FABRICATOR TO PROVIDE SHOP DRAWINGS TO THE OWNER FOR REVIEW PRIOR TO FABRICATION.
 7. WALKWAY TREAD SHALL BE DESIGNED FOR A MINIMUM TOTAL LOADING OF 500 POUNDS.
 8. A CHAIN AND LOCKING MECHANISM SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR TO ALLOW LOCKING OF THE HANDWHEEL/STEM TO THE STRUCTURE.
 9. ALL BRACING AND CONNECTIONS TO BE DESIGNED BY FABRICATOR.

NO.	REVISION DESCRIPTION	BY	DATE

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CLARK FORK COALITION

LOWER RACETRACK CREEK DIVERSION

HEADGATE DETAILS

SHEET NO.
7
OF 7